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THE DEVELOPMENT OF BILLINGUAL INTERACTIVE E-BOOK WITH CONTEXTUAL TEACHING AND LEARNING ORIENTED ON ELECTROLYSIS SUB TOPIC

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Abstrak: Tujuan penelitian ini adalah untuk mengetahui kelayakan *E-book* berdasarkan penilaian guru yang meliputi kelayakan kesesuaian dengan komponen *CTL*, materi, penyajian ilustrasi, dan bahasa. Metode penelitian ini menggunakan metode *Research & Development (R&D)* dan pada tahap pengembangan menggunakan *4D (define, design, develop, disseminate)* namun hanya terbatas pada tahap *develop*. Instrumen yang digunakan adalah lembar telaah dan lembar validasi. Telaah dilakukan oleh 3 orang dosen kimia dan 1 guru kimia. Validasi dari 3 guru kimia terhadap *E-book* yang dikembangkan memperoleh presentase 81,58% termasuk kategori sangat layak.

Kata Kunci: *E-book, CTL*, kelayakan, Elektrolisis.

Abstract: *The aim of this research to know feasibility of E-book development based on teacher assessment that consist of CTL component, content, layout, and language suitability. This research uses Research & Development (R&D) method and on development step uses 4D models (define, design, develop, disseminate) but it is limited in develop step. Instruments that are used review and validity sheet. Review has been done by three chemistry lecturers and one chemistry teacher. Validity from three chemistry teachers shows that the E-book that was prepared reach 81,58%, included very good (very feasible) category.*

Key words: E-book, CTL, feasibility, Electrolysis

INTRODUCTION

In the globalization era, the development of science and technology is increasing. This increase is dependent on the quality of human resources to be able to utilize and develop the knowledge already acquired. As a result of Indonesia are required to provide innovation in various fields to meet these demands.

In the education field, Indonesia has made innovations in curriculum, teaching methods, and instructional media to support and enhance the quality of education. The formation of qualified human resources and creative depending on the success of an education because education is very important in life and can not be separated from life[1]. In addition, the government also work on improving the quality of education in order to compete internationally. One way is to open up international school.

International school is a school with a adoptive and adaptive curriculum[2]. Legal basis is the Law. 20 of 2003 Article 50, paragraph 3. The curriculum used is KTSP curriculum as national curriculum that adapted to curriculum that is applicable in Cambridge that is, Cambridge International Examination (CIE) as a reference for International Schools (IS). In practice, the learning done in billingual. According to the Directorate of International Schools determines that the IS program imposed English as the medium of learning, at an early stage is applied only to subjects that are categorized as hard science, namely Mathematics, Physic, Chemistry, and Biology[3].

Referring to the above, the learning process is applied in principle is the

communication process[4]. Instructional media is a vehicle to deliver information or messages on student learning. With the media in the learning process, is expected to help teachers to improve learning achievement in students. Instructional media experienced growth every year, because each medium has it's drawbacks, according to their use shall be made the discovery of new media and use media that has been updated. One of the media that can be developed is the media referring to a person's ability to communicate through verbal and auditory language, such as e-book.

E-book is a book in electronic format that is run by the computer contains material aids, practice questions, and students can directly interact with the computer, choose a menu that has been provided in the e-book in accordance with the wishes of his own, as well as e-book that can process answers to students directly[5].

Based on the results of questionnaires to the students and teacher interviews to the SMA N 1 Sidayu Gresik said that chemistry is a subject that is quite difficult. This can be caused by several factors, one due to the use of two languages, namely the Indonesian language and English in the IS classroom difficult for students to understand the material presented by the teacher. Besides the limitations of billingual interactive media that can help students to understand the material. Based on the results of questionnaires media used is billingual textbooks.

One of the chemical material that is difficult is electrolysis. Electrolysis is a fairly complex matter, contains the concept of reactions of the electrolysis cell, the calculation is based on Faraday's law, and its application in daily life. In addition, the questionnaire showed 76% of 25 children in XII class of SMA N 1 Sidayu Gresik said electrolysis material including material that is difficult and the results of their study to the lack of good material. Values obtained by the students on the material of about 29.03% is still not meet the minimum criteria for completeness and classical completeness of 75%. Therefore, the material used in this research is electrolysis

Standard of competence for sub material of electrolysis is applying the concept of oxidation-reduction reactions and electrochemistry in technology and daily life. Based on these can be seen that sub material of electrolysis related to daily life. Thus, the student should be able to make connections between the knowledge gained by its application in daily life. Based on the questionnaire, 100% of 25 IS XII class of SMA N 1 Sidayu Gresik expressed desire of learning associated with daily life, then the appropriate approach is Contextual Teaching and Learning (CTL) is a learning strategy that emphasizes the process of student engagement in full to be able to find material that is learned and relate it to real life situations that encourage students to be able to apply it in daily life[6].

This research is done to determine the feasibility of billingual interactive e-book media with CTL oriented on electrolysis sub topic that reviewed from the suitability of the material, CTL component, layout, and language. This E-book can help student to understood of electrolysis matter and can use as instructional media in chemistry learning in Senior High School especially in IS class.

METHOD

This research follows the method of Research & Development (R &D) [7], whereas at the stage of development using 4D models that consist of define, design, develop, and disseminate[8]. But this is only limited research to develop. Here is a picture of the research design is presented in Figure 1.

The research was done in SMA N 1 Sidayu Gresik on Wednesday, April 4th 2012 in class XII IPA-3.

Research instruments used were review and validity sheets . Review

done by three chemistry lecturers (1 matter experts, a media expert, and a language expert) and a chemistry teacher. Validation is performed by three teachers of chemistry. Criteria considered include: compliance with the CTL component, material, layout, and language.

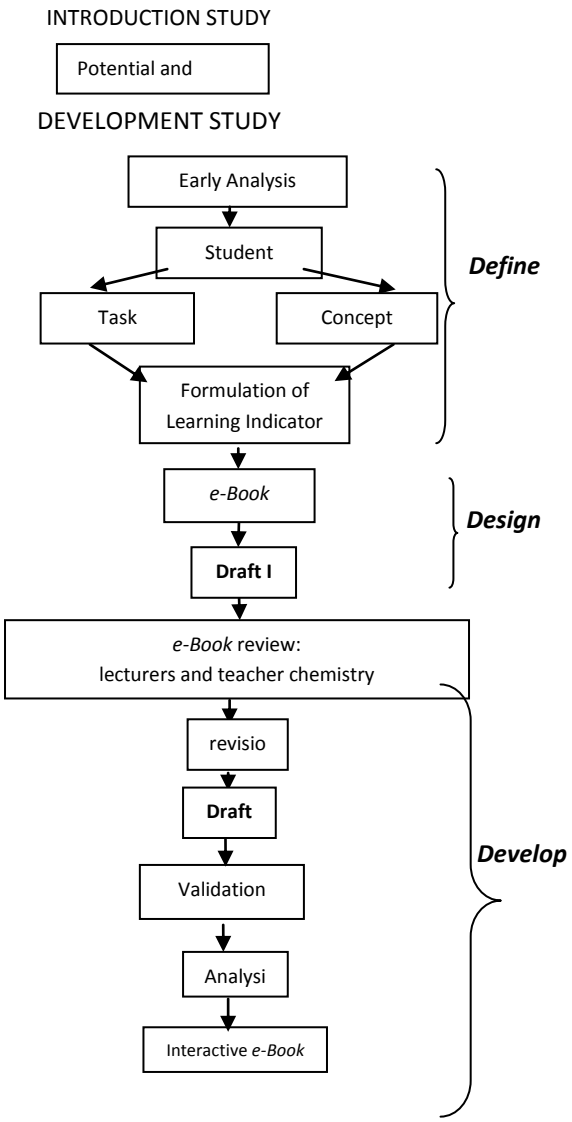

Figure 1. Research Design

Data analysis methods used is quantitative descriptive analysis. The analysis was done on every aspect related to the format and quality of e-Book. The percentage of the data obtained by the calculationof this questionnaire Likert scale as in Table 1.

Table 1 Score of Likert Scale

Valuation	Score
Very good	4
Good	3
Bad	2
Very bad	1

Riduwan[9].

Formula that used in calculation to get percentage such as:

$$K = \frac{F}{N \times I \times R} \times 100\%$$

Note:
K = feasibility percentage
F = total number of respondents' answers
N = maximum score in question-naire
I = total of question in question-naire
R = total of validator

Analysis result of chemistry teachers assessment are used to know feasibility of *e-Book* with score interpretation such as:

Table 2 Score Interpretation

Percentage	Criteria
0% - 20%	Vey less
21% - 40%	Less
41% - 60%	Enough
61% - 80%	Feasible
81% - 100%	Very feasible

Riduwan[9].

RESULT AND ANALYSIS

Calculation results of the validation from chemistry teachers to four criteria e-book can be seen in Table 3.

Tabel 3 Validation result from chemistry teachers

No	Criteria	Percentage(%)	Category
1	CTL component	83,33	Very feasible
2	Material	88,89	Very feasible
3	Layout	79,76	Feasible
4	Language	77,08	Feasible
	Average	81,58%	Very feasible

Analysis of assessment data from chemistry teachers to the bilingual interactive E-book with the CTL oriented on Electrolysis material sub are done by quantitative descriptive. According Riduwan [9], E-book is said feasible if it satisfies the percentage by 61% -80% and is very feasible it satisfies the percentage of 81% -100%. Based on Table 3, it can be seen that based on had been satisfied criteria of compliance with the CTL component is very feasible the category with average percentage is 83.33%. CTL components are included in the assessment include, contructivism, questioning, inquiry learning community, and modeling, while for the aspect of reflection and authentic assessment not included because one of the characteristics of authentic assessment is a measure of skills and performance, rather than considering the facts. It is difficult to apply in the E-book.

Constructivism component in this research appear in the introduction that contains a problem in daily life that are sensitive to the environment, student activity that allows students to have real experience and interpret the experience, and focus feature which contains questions that focus on the electrolysis material, obtained a percentage of 83.33%.

Questioning component in this research appear in the focus and let's ask features. These features may earn a percentage of 75%. These results are supported by data validation which states that the focus feature that contains the questions to motivate and focus students on the material on the features of electrolysis and let's ask that contains the tasks that the students make a question about the electrolysis of material that has not been understood and answered in groups.

Inquiry component look at the features of scientific work on Pages 22. These features are getting a percentage of 83.33%. These results are supported by data validation features of scientific work that contains a simple experiment to identify the influence of strong electric current to the mass of Cu is deposited on the electrolysis of a solution of $Cu(NO_3)_2$ with Cu electrodes, asking students to define problems, ropose hypotheses, analyze data , and make conclusions.

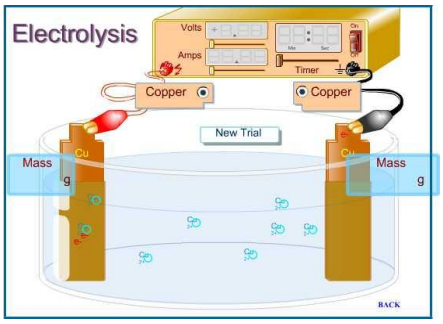

Figure 2. pages 22 scientific work feature

Learning community component appear in the focus and let's ask features. These features are getting a percentage of 83.33%. These results are supported by data validation which states that the feature is implemented with a heterogeneous group discussions and sharing with teachers, so that both features can encourage students to work together in groups to learn and can share their opinions. Students involved in community activities to learn, can provide the information required by his friend and also can get information from friends.

Modeling component seen from the animation and video . These features are getting a percentage of 91.67%. These results are supported by data validation which states that the animation and video presented some information to students to assist them in operating, working, or making something.

Based on criteria in compliance with the material is get average percentage is 88.89% with category very feasible. Aspects that are valuated include: the material in this e-book with the relevant standards of competence, basic competence, and indicators and component of the material in this e-book contains the truth of the content (facts, laws, concepts, and principles), percentage gain of 91.67%, including the category of very feasible. Shows the

relationship of science, technology and society, this component is obtained from the validator assessments of 83.33%, including the category of very feasible.

Layout criteria for the presentation of E-book by BSNP[10] include: the concept presented coherent and balanced among sub chapter from beginning to end, the layout of text, images and tables are in harmony, the presentation of material centered on the learner is to motivate students to learn independently, presentation and discussion of more emphasis on process skills and attention to safety, the variations interesting and not boring presentation, completeness of presentation such as: the introduction, table of contents and reference, and illustrations are presented and clarify the relevant subject matter.

Based on the assessment given by the validator, E-book has been developed to meet the criteria of layout by category average percentage is 79.76%.

In component of the concept presented coherent and balanced among sub chapters from start to finish, presentation of learner-centered materials that motivate students to learn independently, and variations in the presentation interesting and not boring are get precentage 83.33%, including very feasible. Whereas the layout of text, images and tables are in harmony is getting a percentage of 66.67%, including feasible. This indicates that the layout of text, images and tables contained in the e-book is good, but still needs improvement.

For component of presentation and discussion of more emphasis on process skills and attention to safety and the illustrations are presented relevant and clarify the subject matter, get feasible category with percentage of assessment as much as 75%. Whereas component of completeness of presentation such as: Introduction, Table of Contents and reference get very feasible category with precentage of assessment as much as 91.67%

Criteria of suitable with language for e-book get feasible category with the average percentage is 77.08%. Linguistic assessment of the eligibility criteria outlined as follows: writing E-book in English is good and true, the language used in accordance with the age of the student (student level thinking), and writing E-book uses terms that are easily understood are get feasible category with the average precentage is 75%. Whereas writing E-book using terms and symbol are steady is getting a percentage of 83.33%, including the category of very feasible.

Of the overall assessment of the validator to get the average percentage of 81.58% and the category of very good (very feasible).

CONCLUSION AND ADVISE

Based on the analysis can be concluded that the bilingual interactive E-book with CTL oriented on Electrolysis sub topic has been developed to meet the suitability criteria of CTL component, material, layout, and language with an average percentage of 81.58% and including the category of very feasible. This research only reached the stage of develop, therefore it is necessary to study further at this stage of disseminate.

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